

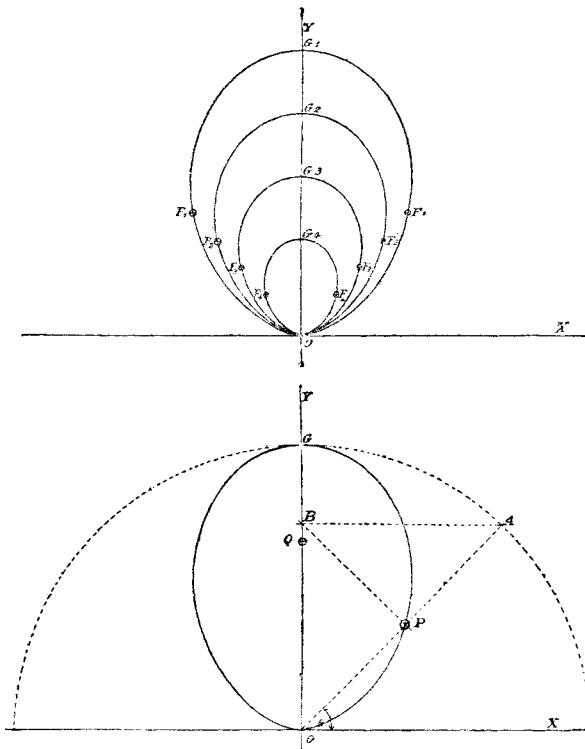
This immediately suggests the following construction:—

Take $OG = C$, and with this as radius, describe a semicircle. Draw any radius OA , then take AB perpendicular to OY , and BP perpendicular to OA . then P is a point on the required curve. Because

$$OB = OA \cdot \cos OAB \\ = OA \sin \theta, \quad \text{where } \theta = \text{angle } AOX.$$

$$\text{Also } OP = OB \sin \theta \\ = OA \sin^2 \theta.$$

Therefore P is a point on the curve.



In a similar manner any number of points on the curve may be obtained; and by varying the length OG , we get different curves of the same class.

Near to the point G in the figure, the points on the curve cannot be constructed accurately by the method just given; but if the radius of curvature for the point $(x = 0)$ be calculated, it will be found that for the point G it is $\frac{OG}{3}$. Q is the centre of curvature. And a large arc of the circle described about Q with radius QG coincides with the curve. Thus the whole curve may be constructed with great accuracy.

From equation (1) radius of curvature at any point (x, y) is given by

$$\rho = \frac{C \cdot y (4x^2 + y^2)^{\frac{3}{2}}}{3(2x^2 + y^2)(x^2 + y^2)}$$

or, with x eliminated by (1),

$$\rho = \frac{C^{\frac{1}{3}} \cdot y^{\frac{1}{3}} \cdot (4C^{\frac{2}{3}} - 3y^{\frac{2}{3}})^{\frac{2}{3}}}{3(2C^{\frac{2}{3}} - y^{\frac{2}{3}})}$$

Thus $y = .432 C$ gives the point of maximum radius of curvature.

Lines of force—

$$\frac{y^2}{(x^2 + y^2)^{\frac{3}{2}}} = \frac{1}{C}.$$

These curves may be obtained by giving to C the values

$$C = OG_1, \\ C = OG_2, \\ C = OG_3, \\ C = OG_4.$$

The points (F) are points of minimum curvature.

Glasgow, January 29

JOHN BUCHANAN

Prehistoric Man in Japan

IN an article on this subject (NATURE, vol. xxi. p. 350) by Mr. F. V. Dickins, there is a mistake in dates. He says: "The 'adzuma' or eastern region of the main island was probably peopled chiefly by an Aino race, up to the fourteenth or fifteenth centuries." He hesitates to assign a higher antiquity to the Omori heaps (which were discovered by Prof. Morse) than the thirteenth or fourteenth century, and yet thinks it probable that they were the works of an Aino race. But the fact is that this part of the island was already inhabited by the present race, who had expelled the Ainos long before those periods. Consequently if, as he thinks, the heaps were the remains of the thirteenth or fourteenth century, they cannot be the works of the Ainos; if, on the other hand, they were the works of the Ainos, a much higher antiquity ought to be assigned to them. Such being the case, either one of his conclusions must be incorrect.

London

S. SUGIURA

Monkeys in the West Indies

IN NATURE, vol. xxi. p. 131, there is a letter from Mr. Edmund Watt, of Dominica, calling in question the correctness of Prof. Mivart's statement in his paper on "Tails," regarding the non-existence of monkeys in the West Indies.

If by this statement Prof. Mivart means that monkeys are not to be found wild at the present time in any of the West India islands, it is certainly incorrect, as they abound in St. Christopher and Nevis.

If, on the contrary, and what is much more probable, he means that monkeys are not *native* in any of these islands, then he has made no mistake, as I think I shall be able to show.

It certainly does appear remarkable that no species of monkey should exist in the wild state in any of these islands along the whole range from Grenada to Jamaica, with the exception of St. Christopher and Nevis, and the question that naturally presents itself is, Have they been introduced? I am not aware that there is any tradition to this effect in either of these colonies.

It appeared to me that the most likely mode of obtaining information on this point would be to examine all the old West India histories in my possession, as those writers who treated of the natural history of the islands could not fail to notice so singular a fact as the existence of monkeys in two neighbouring islands and in none of the others. The first history examined was that of Rochefort, "Histoire Naturelle et Morale des Antilles, 1665." He names and describes all the mammalia in the West Indies known to him, but no mention whatever is made of monkeys. The next work examined was the "Histoire Générale des Antilles," by Père Du Tertre, 1667, a most interesting book, but little known. Du Tertre was a man of keen observation, and he has devoted a large portion of his work to natural history. He gives a very clear description of all the mammalia with which he was acquainted, but there is not a word about monkeys. This is the more notable from the fact that St. Christopher was considered the mother colony of the other French settlements, and Du Tertre lived there for several years, and visited the island frequently. From the negative evidence afforded by Rochefort and Du Tertre, it may be concluded that monkeys did not then exist in these islands, and, in consequence, must have been subsequently introduced.

On examining a third historical work on the West Indies, that of Père Labat, "Nouveau Voyage aux Antilles, 1744," conclusive evidence was discovered of the *when* and the *how* of the importation of the monkey family into St. Christopher.

Father Labat says that he paid a visit to St. Christopher in the year 1700. He describes the French quarter, the island being inhabited at the time by French and English, and gives a very amusing account of a monkey hunt (*chasse des singes*). He makes the following statement regarding the introduction of monkeys into the island, which I give in the original. "Pendant que les Anglais étaient demeurés maîtres des terres des François, dont la plus grande partie resterent en friche, les singes qui s'étoient échappés des maisons des François pendant la guerre, multiplièrent tellement que quand on reprit possession de l'île on les voyoit par grosses troupes. Ils venoient voler jusques dans les maisons, & lorsqu'on plantoit des cannes, des patates ou autres choses, il falloit y faire sentinelle jour et nuit, si on vouloit que ces animaux n'emportassent pas tout ce qu'on avoit mis en terre."

It is thus made clear that the existence of monkeys in St.

Kitts (in the wild state) dates from about ten years previous to the visit of Labat, in 1700—so that they have been denizens of the island close upon two centuries now. The manner of their introduction may not even have been known to the English settlers of the colony.

It was on this occasion, the good Father informs us, that he first ate monkey. “It is true,” he says, “I was a good deal shocked when I saw four heads in the soup, very much resembling infants’ heads, but when I tasted of the dish I had no difficulty in overcoming my scruples, and continued to eat with pleasure,” for, he adds, “C'est une chair tendre, délicate, blanche, pleine d'un bon suc, & qui est également bonne à quelque sorte de sauce qu'on la mette.”

The worthy Father feelingly dwells upon the admirable qualities of young monkeys in the form of soup or otherwise. The people of St. Christopher and Nevis might benefit by the experience and example of good Father Labat. Why not try young monkey as an article of diet generally? The planters would thus receive some compensation for the destruction of their canes and provisions by this pestilent mammal.

Trinidad, in a natural history point of view, may be considered more as a portion of South America than as belonging to the West India Islands proper. The two kinds of monkeys found in Trinidad are, I believe, met with in the opposite mainland. There is, therefore, no mystery as regards their existence in that island. The same remark applies to Nevis with respect to St. Christopher.

An example of almost exactly the same nature as that above related regarding the monkeys of St. Christopher has taken place in Dominica within the last half-century, and in like manner might pass out of remembrance unless placed on record.

About forty years ago a planter of this island visited his friends in Martinique: in returning from thence he brought with him two opossums, male and female. Shortly after they unfortunately escaped from their cage, and made their way into the woods. This was the current belief at the time and afterwards. The fact, however, is certain of the importation of the animal about that period. Their numbers increased rapidly, and not many years had passed when one of the results of their presence in the forests was the disappearance of the large frog, or crapaud, of the island, upon which the *Manicere* (as called by our people) preyed. The southern district of the island, where the pair escaped, was first nearly cleared of crapauds; but as the opossums multiplied they gradually extended over the whole island, with the exception of a part of the northern district, and as they spread, the frogs for most part were destroyed, and it was feared might be finally exterminated; but lately it would seem that their numbers have somewhat increased, and the opossums are probably not so numerous.

Fortunately our peasantry eat the opossum with great satisfaction, and set traps in the woods to catch them and hunt them on all occasions.

The large frog, or crapaud, of this island, *Cystignothus ocellatus*, I believe, is a part of the dietary of the people of all classes in the colony. It is very wholesome and much relished. Its extensive destruction by the mischievous opossum has been a great evil to the country, but its extermination would be a serious loss. Happily, however, it appears to be gaining ground of late, though it can never abound as formerly while the “Manicere” exists in our woods.

JOHN IMRAY

Dominica, January 10

Intellect in Brutea.

I SEND the following notes on the habits of the red or agricultural and the small black ant, which may be of interest to the readers of NATURE:—

I have been stationed for several years where the red or agricultural as well as the small black ant are common, and have observed with much interest their habits. The burrows of the red ant are said to be very deep, always extending to water, and it is stated that one has been followed for a depth of twenty feet.

I have never seen any evidences of the sowing of seeds, but have frequently seen them carrying leaves of grasses and grass-seeds into their burrows.

The mounds are usually from two to three feet in diameter at base and one foot in height, are made of gravel, and frequently ornamented with bits of crockery, beads, or pins, as opportunity may offer. The warriors are very bold, attacking anything which

may trespass upon their grounds; I have often placed a centipede or scorpion upon the mound, and observed them attack and destroy it.

The fighting is all done by the warriors, who, on being called upon by the sentries, sally out in great numbers, and rush to the attack; some seize and hold the victim, while others attack it on every side; as soon as it ceases struggling, the warriors return to their burrows, leaving to the workers the labour of cutting up and carrying in.

Hospital-Steward Smith, U.S. Army, states that in Arizona and Idaho he has observed that these ants render much service by freeing houses of that insect pest so common in warm climates, *Cimex lectularius*.

One day last autumn, while halting for lunch on the banks of the Cinnamon River, I.T., a forager belonging to a party of black ants was observed to discover some sugar which had been dropped upon the ground; the ant immediately ran off, and soon returned, followed by a long line of its fellows. The first to arrive did not carry away any of the treasure, but seemed to resolve themselves into guides for the approaching column; they ran back upon the trail, and every now and then an ant in the advancing column seeming to be in doubt as to the correctness of its course, would run out of the line and approaching a guide, would confer a moment with him, then, reassured, would hasten back to the line and continue on its course.

Post Hospital, U.S. Army, T. E. WILCOX
Boise Barracks, Idaho Terr., Dec. 23, 1879

Stags' Horns

A FEW weeks ago I was staying with a friend in Sussex, in whose park are about sixty red deer, and upon my asking him whether he had ever picked up any cast-off antlers, he replied that he had not only picked up some that were gnawed, but had actually himself seen them gnawing them. He has promised to send me some specimens after this year's shedding.

G. J. R.

THE VOLCANIC ERUPTION IN DOMINICA

ON Sunday, January 4, shortly after eleven o'clock in the morning, a volcanic eruption occurred in the Grande Soufrière district of Dominica. This district is situated near to the centre of the southern third of the island; and before the late eruption its volcanic energy was manifested by the action of four solfataras and by the Boiling Lake. During the morning of January 4, the weather in the town of Roseau—the capital of the island, was cool and showery; but shortly before eleven o'clock the sky became overcast and heavy rain began to fall, accompanied with thunder and lightning. Soon afterwards the sky darkened, the rain poured in torrents; a powerful odour of sulphuretted hydrogen pervaded the atmosphere; the lightning increased in vividness; and thunder of a peculiar sound, and without the usual reverberation, crashed for several minutes with intermissions of so short a duration as to be scarcely recognisable. After the lapse of about five minutes the darkness began to lift, and it was then seen that the rain was bringing down volcanic ash of a light greyish colour and metallic lustre. The ash fell for about nine minutes, covering the ground to the extent of a quarter of an inch, and during the time everything had a dull leaden aspect, whilst the mud rolled off the houses and the leaves of the trees like big globules of partially oxidised mercury. During the time the ash was falling I noted that the barometer indicated a pressure of 30°10 inches, and a few hours afterwards the mercury fell to 29°96 inches. The Roseau River, which rises near to the volcanic district, became a raging torrent, flooding the land through which it passed and creating great destruction; its water became of an opaque white colour, and even now, more than three weeks after the eruption, the white colour remains, though in a lesser degree. It is worthy of notice that the greater body of water came from the vicinity of the eruption, for the